

An Extract of a Letter of Dr. J. Wallis, to M. Hevelius, from Oxford, Decemb. 31. 1673. gratulatory for his *Organographia*; and particularly concerning *Divisions by Diagonals*, lately inserted in Mr. Hook's Animadversions on the first part of the *Machina Cœlestis* of the Honourable Job. Hevelius; but so faultily there printed, that it was thought fit, at the Author's desire, in his Letter to the Publisher, of *Januar. 4. 1674.* to be here done more correctedly.

**D**uplici saltem nomine, (*Clarissime Celeberrimæq; Vir,*) gratias Tibi referendas habeo; meo scilicet, & totius *Academiæ*; propter duo dono data *Organographiæ tuæ nuper editæ Exemplaria*, *Clarissimi Oldenburgii curâ tradita*. Quorum alterum, mihi destinatum, exosculatus; alterum Insignissimo Vice-Cancellario tradidi, in *Bodleianâ Bibliothecâ* (cum reliquis studiorum tuorum monumentis) reponendum. Qui suo propterea atq; *Academiæ nomine* grates rependi voluit: Mibiq; vices suas hac in re permisit.

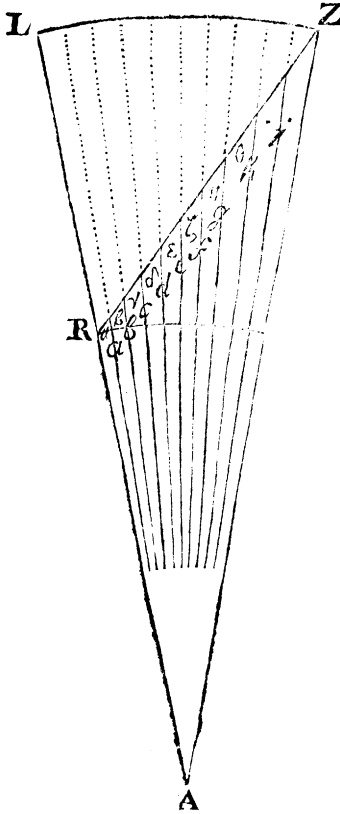
Sed & est cur, communi omnium *Literatorum nomine*, rebus præsertim *Cœlicis addictorum*, reddam gratias; tum ob immensos in tanto apparatu sumptus erogatos, tam pretiosam conquirendo *Supellectilem Astronomicam*, graphice hic descriptam; tum ob indefessos labores, insomnes noctes diésq; occupatissimos, *Cœlestibus acquirendis Observationibus impensos*, quarum vim ingentem, *Thesaurum supra Aurum & Margaritas pretiosum*, *Erudito Orbi jam ante dederis*, plura daturus indies. Verum non est ut sperem, me verbis æquare posse tua merita; qui ex privato penu sumptus planè *Regios erogasti*; onusq; suscepisti non infeliciter, *Herculeis humeris* (ne *Atlanteis dicam*) formidandum.

Operis partem maximam jam evolvi; miratus inibi tantæ *Instrumentorum ingeniosum regimen*; & subtilissimam *Divisionum administrationem*; cum pari diligentia conjunctam in *Regulis & Dioptris sollicitè curandis*: Et quidem si hoc deesset, reliquus in cassum cederet labor; quippe, exiguus & vix evitabilis in *Regulis aut Dioptris error*, totum *Instrumentum vitia*ret, omnesq; inficeret *Observationes*.

Sed singulis immorari non licet. Unum tamen est quod attingam breviter; Nempe, *Divisiones per lineas Diagonales*, circulos in *Limbo concentricos interfecantes*. Hanc *Dividendi methodum*, jamdiu receptam, ipse retines; & quidem meritò; *Circulosq; hos concentricos, æqualibus intervallis disjunctos habes*. Quod quamvis in *exiguorum*, aut etiam *mediocrium*, *Instrumentorum Limbis latioribus*, aliquid erroris possit inducere; in *Tuis tamen tantæ amplitudinis, Instrumentis*, cum *limbis exiguæ latitudinis*, (quod & tu rectè mones,) nihil quicquam erit *discriminis quod in sensus incurrere possit*.

Hac tamen occasione libet hic subijcere quod eâ de re jam olim (circa *Annum 1650, aut 1651*) meditatus sum; atq; apud *Adversaria mea* jam reperio. Nempe; si quis vellet *minoris Instrumenti Limbum latiore lineis Diagonalibus sic dividere*; quibus intervallis oporteat concentricos illos *Circulos disponere*, ut *Angulos invicem æquales designarent illæ circulorum cum transversali interseccionem*; calculo *Trigonometrico determinare*.

*Divisio*



*Divisio Arcus in Limbo Quadrantis (aliùsve ejusmodi Instrumenti) per Circulos Concentricos, & Rectam Diagonalem.*

*Sit Latitudo Limbi (RL=) L. Radius circuli intimi (AR=) R; extimi (AZ=AL=) L+R=Z; continentes Angulum (RAZ=) A; dividendum in partes quotlibet æquales (quarum numerus n,) Rectis a, b, c, &c. (quarum longitudo quæritur,) facientibus, ad RZ diagonalem, Angulos  $\alpha$ ,  $\beta$ ,  $\gamma$ , &c. Adeoque  $RAa=\frac{1}{n}A$ ,  $RAb=\frac{2}{n}A$ ,  $RAc=\frac{3}{n}A$ , &c. Sitque  $ARZ=O$ , &  $AZR=V$ .*

*Datis ergo Cruribus R, Z, cum Angulo contento A, (adeoque reliquorum summâ  $O+V$ , inveniuntur reliqui, (O obtusus, V acutus :) Nam.*

$$Z+R. Z-R :: \text{tang}; \frac{O+V}{2}. \text{tang}; \frac{Z}{2}.$$

$$\text{Et } \frac{O+V}{2} + \frac{O-V}{2} = O.$$

*Deinde; Cognitis Angulis O, &  $\frac{1}{n}A$ , (adeoque reliquo  $\alpha$ , (cum interjecto Latere R; habetur Latus a.*

$$\text{Nempe,} \quad \text{Sin}; \alpha. \quad R :: \text{Sin}; O. \quad a.$$

$$\text{Et, pari modo, ex cognitis} \left\{ \begin{array}{l} O, \frac{2}{n}A, \\ O, \frac{3}{n}A, \\ O, \frac{4}{n}A, \\ \text{\&c.} \end{array} \right\} \text{habentur} \left\{ \begin{array}{l} a. \\ b. \\ c. \\ d. \text{\&c.} \end{array} \right\}$$

*Praxis.*

*Sit  $R=1$ .  $L=0, 2$ .  $Z=1, 2$ .  $A=10'$ . Ergo  $O+V=179^\circ, 50'$   
Et  $\frac{O+V}{2}=89^\circ, 55'$ . Tum*

*Ut  $Z+R=2, 2$ . ad  $Z-R=0, 2$  ::*

*Sit  $\text{tang}; \frac{O+V}{2}=687,5488693$ . ad  $62,5044427=\text{tang}; \frac{O-V}{2}$ . cui respondet Angulus  $89^\circ, 5', 0', 17''$ , proximè. Ergo  $\frac{O+V}{2} + \frac{O-V}{2} = O = 179^\circ, 0', 0'', 17'''$ , fere, Cujus Sinus  $0, 0174511$ : nempe idem cum sinu  $0^\circ, 59', 59'', 43'''$ .*

*Deinde; secandus fit Angulus A, in 10 partes, quorum quælibet i. Quærantur igitur, a, b, c, d, e, f, g, h, i. Nempe,*

$\text{Sin}; \alpha (0,58,59,43), 0,0171603.$	$R=1 :: \text{Sin}; O=0,0174511.$	$1,01694=a.$	1694
$\text{Sin}; \beta (0,57,59,43), 0,0168694.$	$R=1 :: \text{Sin}; O=0,0174511.$	$1,03448=b.$	1754
$\text{Sin}; \gamma (0,56,59,43), 0,0165780.$	$R=1 :: \text{Sin}; O=0,0174511.$	$1,05264=c.$	1816
$\text{Sin}; \delta (0,55,59,43), 0,0162877.$		$1,07144=d.$	1880
$\text{Sin}; \epsilon (0,54,59,43), 0,0159969.$		$1,09091=e.$	1947
$\text{Sin}; \zeta (0,53,59,43), 0,0157060.$		$1,11110=f.$	2019
$\text{Sin}; \eta (0,52,59,43), 0,0154152.$		$1,13206=g.$	2096
$\text{Sin}; \theta (0,51,59,43), 0,0151243.$		$1,15383=h.$	2177
$\text{Sin}; i (0,50,59,43), 0,0148335.$		$1,17647=i.$	2264
		$1,20000=Z.$	2353

*Praxis*

## Praxis altera.

Sit  $R=1$ ,  $L=0$ ,  $I$ ,  $Z=1$ ,  $I$ ,  $A=10'$ . Ergo  $O+V=179^{\circ}.50'.42''=89^{\circ}.55'$  *cujus Tangens* 687, 5488693. Et, ut 2, 1. ad 0, 1 :: sic 687, 5488693. ad 32, 7404223  $\frac{1}{2}$  = tang; gr. 88, 15', 1'', 57'''  $\frac{1}{4}$  = tang;  $\frac{1}{2}$ . Ergo  $\frac{0}{2} + \frac{v}{2} = 0$  = gr; 178, 10', 1'', 57'''  $\frac{1}{4}$ . Cujus Complementum ad Semicirculum, gr. 1, 49', 58'', 2'''  $\frac{1}{4}$ . Cujus Sinus 0, 0319827. Ergo.

	1,00000=R.	
Sin; $\alpha$ (=10, 48', 58'', 2''' $\frac{1}{4}$ )	=316920)319827(1,00918=a.	918 16
Sin; $\beta$ (=1, 47, 58, 2''' $\frac{1}{4}$ )	=314013)319827(1,01852=b.	934 17
Sin; $\gamma$ (=1, 46, 58, 2''' $\frac{1}{4}$ )	=311103)319827(1,02803=c.	951 17
Sin; $\delta$ (=1, 45, 58, 2''' $\frac{1}{4}$ )	=308198)319827(1,03773=d.	970 19
Sin; $\epsilon$ (=1, 44, 58, 2''' $\frac{1}{4}$ )	=305290)319827(1,04762=e.	989 18
	302343)	(1,05769=f. 1007 20
	299475)	(1,06796=g. 1027 20
	296567)	(1,07843=h. 1047 21
	293660)	(1,08911=i. 1068 21
	290752)	(1,09990=k. 1089 21
		=z

Haecenus *Adversaria nostra*. Ubi duos casus expendimus: Nempe, cum Latitudo Limbi ponitur pars Quinta, & pars Decima, brevioris Radii, & Angulus dividendus, 10 minuta prima: Tantâ fere  $\alpha\alpha\alpha\alpha\alpha$  quantum feret vulgaris Canon Trigonometricus. Et quidem ultima Unitas in ambiguo est; nunc justo major, nunc justo minor. Radium autem (ut ego soleo) facio 1; non, ut plerumque fit, 10000000; quò omnes Multiplicationes & Divisiones per Radium faciendæ præcitantur. Adeoque Sinus habeo pro partibus Decimalibus; quibus itaque, cum opus est, Ciphras præmitto, quo de Unius Integri loco constet.

Simili processu utendum erit, mutatis mutandis, si Latitudo Limbi sumatur in aliâ quâvis proportionem ad Radii longitudinem.

Sed commodius erit (ad vitandam molestiam toties quærendi partem proportionalem) ut sumatur angulus O commodæ magnitudinis (justis minutis primis determinandæ, absq; annexis secundis tertiisve;) atq; ita quærat Radii maximi Z longitudo, eodem modo quo reliquorum a, b, c, &c. Putâ, si, in Praxi posteriore, sumpto ut prius  $R=1$ , & Angulo,  $A=10'$ , sumatur Angulus O, (non qui illic prodit 178°, 10', 1'', 57'''  $\frac{1}{4}$  sed potius) 178°, 10'; *cujus complementum* 1°, 50'; hujusq; sinus in ipso Canone habetur 0, 0319922; & reliquorum item,  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$ , &c. Sinus similiter ibidem habebuntur; ut unâ tantum Divisione opus sit pro singulis exhibendis; ipsâque Radii Z longitudo, non quidem præcisè ut prius 1, 1; sed huic proxima (quæ itaque sumenda erit) 1, 09996. Nempe,

	1,00000.=R.	
Sin; $\alpha$ (=1, 49, =317015)319922(1,00917,=a.		917 17
Sin; $\beta$ (=1, 48, =314105)319922(1,01851,=b.		934 18
Sin; $\gamma$ (=1, 47, =311200)319922(1,02803,=c.		952 17
	308293,319922(1,03772,=d.	969 17
	305385)	(1,04760,=e. 988 19
	302478)	(1,05767,=f. 1007 19
	299570)	(1,06794,=g. 1027 20
	296662)	(1,07841,=h. 1047 20
	293745)	(1,08908,=i. 1067 21
	290847)	(1,09996,=k. 1088 21
		=z.

K k

Similiter

*Similiter omnino res succedet, si, sumptis Radiis R, L, cum Angulo A, quaeramus V, & Radios intermedios; aut, sumpto Radio L, cum Angulis A, V, quaerantur R, & Radii intermedii.*

*Verum, si Limbi Latitudo sit Radii non nisi pars Trigesima, Quadragesima, aut adhuc minor; atque Angulus dividendus, non quidem 10 minuta prima, sed totidem secunda, seu minor adhuc: subtilior res est quam ut vulgaris Canon Trigonometricus hic adhibeatur, & quæ omnem sensum fugit; ipsique Circuli concentrici distantis æqualibus, quantum sensu possumus distinguere, invicem disjuncti: quippe unius Pollicis pars millesima, nedum decies aut centies millesima, minor est discrepantia quam ut sensu percipi possit.*

*Sed nimius sum in re levi. Felicem itaque jam ineuntem Annum comprecatus, longâ sequentium serie continuandum, Valere jubeo.*

### An Account of some Books.

I. *Some Physico-Theological Considerations about the Possibility of the Resurrection; by the Honourable Robert Boyle, Esq; Fellow of the R. Society. London, 1674. in 8<sup>vo</sup>.*

THE Noble Author's design in this Discourse being to shew, that the *Philosophical* Difficulties, urged against the *Possibility* of the RESURRECTION, are nothing so insuperable, as they are by some pretended, and by others granted, to be; and having handled this Subject in such a manner, as to make it appear, that *sound Philosophy* may furnish us with good Weapons for the defence of our Faith, and that *Corpuscularian* Principles may not only be admitted *without* Epicurean Errors, but be employed *against* them: For these reasons, it was thought it would not be altogether besides the purpose of these Tracts, to give some account of this valuable Essay: Wherein 'tis made out by good Philosophical Observations and Experiments, 1. That a Humane Body is not so confin'd to a determinate bulk, but that the same Soul, being united to a portion of duly organiz'd Matter, is acknowledg'd to constitute the same Man, notwithstanding the vast Differences of bigness, which are at several times between the portions of Matter whereto the Human Soul is united. 2. That a considerable part of the Humane Body consists of Bones, which are bodies of a very determinate nature, and not apt to be destroy'd by the operation of Earth or Fire. 3. That of the less stable, and especially the fluid, parts of a Humane Body, there is a far greater expence made by insensible Transpiration, than even Philosophers would imagine. 4. That the small particles of a resolv'd Body may retain their own nature under various alterations and disguises; of which 'tis possible they may be stript afterwards. 5. That without making a Humane Body cease to be the same, it may be repaired and augmented by the adaptation of congruously disposed Matter to that which pre-existed in it. Which things being so, considering Men do not see, why it should be impossible